

## Sustainability Teachers' Academy Lesson Plan

# Measuring Your Ecological Footprint

### Topics Covered

Sustainability  
Ecological Footprint

### Grades

6-8

### Duration

55 Minutes

### Sustainability Competencies

Values Thinking  
Systems Thinking  
Collaborative Thinking  
Action Orientation

### Online Resources

[Global Footprint Network](#)

[Earthday Network](#)

[WWF Footprint Calculator](#)

### Key Questions

What is your ecological footprint?  
How can you reduce your ecological footprint effectively?

### Overview

Students will measure their ecological footprint through online research, and examine effective strategies for reducing their ecological footprint.

### Objectives

Students will be able to:

- Identify the factors that contribute to their ecological footprint
- Compare their ecological footprints to those of other people around the world
- Explore ways to reduce their ecological footprint, and discuss the logistics of doing so
- Explain why reducing their own ecological footprint is important to living sustainably.

### Materials

Per student

- Measuring Your Ecological Foot Print Student Questionnaire

Technology

- One computer, laptop or tablet per student pair/group
- Computer and projector

### Teacher Preparation

Print the student questionnaire for this lesson for all students. This should be assigned as homework the day before performing this lesson so that students have time to discuss each question with members of their household, and collect accurate information.

Prepare student computers, laptops, or tablets for use. Organize student pairs/groups. Provide students access to the following link:

<http://footprintnetwork.org/en/index.php/GFN/page/calculators/>

### Background Information

An “ecological footprint” is an easy way to describe the impact our

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lives have on the Earth's natural systems. You can think of an ecological footprint as a simple representation of all the resources that are used in the sum total of all our daily life choices--where we live, how we get around, even the foods we eat. By accounting for the impact of all these choices, we can compare our ecological footprint, to those of people around the world.

When we do this, we discover some startling facts. For example, if everyone in the world lived like the average American, we would need all the ecological resources of more than four planet Earths to support us all.

### Recommended Procedures

#### 1. Engagement: This activity will focus students on the topic

Assign the Student Questionnaire for homework the day before beginning this lesson. Be sure to instruct students to discuss the questions on the questionnaire with members of their household, and to collect accurate information.

Slide 2: Begin by asking students to come up with their own definition for the term Ecological Footprint. This is a measure of human impact on earth's environmental systems. This can include the use of natural resources, or the production of wastes or environmental damage.

Have students share their ideas about ecological footprints, and the factors that contribute to them. Help students to understand that an ecological footprint can be influenced by a wide variety of choices and activities.

Ask students to think about what factors in their lives contribute to their ecological footprint. Have students share these ideas until a fairly comprehensive list is developed. These should be recorded on a whiteboard or projected for all students to see.

Ask students how they think their quality of life compares to the lives of people in other parts of the world? Are our lives in America more or less comfortable compared to others around the globe? Encourage students to think about what factors cause some of these differences.

Introduce the idea that the United States represents just 4% of the world's population, but uses more than 20% of the world's energy resources. What does this imply about the differences in the way people live around the world?

Have students run the footprint calculator again, and try to reduce their ecological footprint as much as possible. Ask students whether they could reduce their ecological footprint down below 2 Earths. Discuss why they might not be able to do this.

#### 2. Exploration: A student-led activity with guidance

Slide 3: Ask students if it is possible for everyone on the planet to live like they do.

Direct students to visit the Ecological Footprint Calculator from the Global Footprint Network site. Instruct students to calculate their own ecological footprint using the online tool. Students should be encouraged to use information they recorded on their questionnaires, but can estimate some answers as needed.

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When they are finished ask students to share and their results. Estimate the average number of Earths it would take for every person alive to live like they do.

Slide 4: Explain that if every person on Earth lived like the typical American, we would need four and a half Earths to support them all! Since we only have one Earth, this means that Americans consume more of Earth's resources than the vast majority of people on the planet.

Slide 5: This slide shows how many Earths would be needed if everyone on the planet lived like a person in India, China, Costa Rica, France, and the United States. Explain a person's ecological footprint can be very different depending on where they live. This is because different countries use different quantities of the Earth's resources. Some countries are very poor and have limited access to natural resources. Other countries are more sustainable, and work hard to reduce the ecological footprint of their citizens.

Assign different countries to your student groups and have them run the calculation again using the information from one person's questionnaire. Ask students to share which countries had the smallest ecological footprints and discuss why this might be the case.

### **3. Explanation: Students discuss their understanding of the concept**

Slides 6-7: Introduce the following terms:

- Biocapacity
- Ecological Overshoot

Ask students to discuss the relationship between the terms Ecological Footprint, Biocapacity, and Ecological Overshoot.

Slide 8: This slide shows a graph of China's ecological footprint compared to biocapacity (as measured by the global hectares used per person). Ask students to answer the question "Is China in danger of Ecological Overshoot?" by interpreting the information presented in the graph. Students should identify that China's ecological footprint has increased steadily since 1961, and exceeded its biocapacity in 1971. This indicates that China is in danger of ecological overshoot.

### **4. Elaboration: Students apply the idea in a new context**

Slide 9: Ask students to discuss how we can avoid ecological overshoot. Help students make connections between personal behaviors that reduce their ecological footprint, and helping to avoid ecological overshoot.

Slide 10: Finally, allow students to discuss how they can reduce their ecological footprint. Compile a list of 3 to 5 actions or strategies that students can do to reduce their footprint. These can include carpooling, recycling, eating less meat, etc.

### **5. Evaluation: Students assess their knowledge, skills, abilities**

Evaluate students based on their participation during this activity.

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### Extensions

Students could work together in committees (each addressing one key part of the ecological footprint) to decide on a strategy to reduce the ecological footprint of the class, or school. Students could develop and implement a campaign to encourage other students to make sustainable choices.

### Vocabulary

**Ecological Footprint:** The complete impact of a person or community on the environment and its resources

**Biocapacity:** The ability of an ecosystem to provide resources and services to the organisms that live in it. This can include resources such as food, fuel, and shelter, and services such as waste cycling, or absorption of carbon dioxide

**Ecological Overshoot:** This occurs when the population exceeds the biocapacity of its environment. This can occur when people use natural resources (such as food, or fuel) faster than those resources can be replaced by natural processes

### References

Footprint Calculator. (2016, May 1). Retrieved June 01, 2016, from <http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/>

## Measuring Your Ecological Footprint

### Next Generation Science Standards

| Science and Engineering Practices                    | Disciplinary Core Ideas                                | Crosscutting Concepts           |
|------------------------------------------------------|--------------------------------------------------------|---------------------------------|
| Asking questions and defining problems               | ESS3.A Natural resources                               | Scale, proportion, and quantity |
| Developing and using models                          | ESS3.C Human impacts on Earth systems                  | Stability and change            |
| Obtaining, evaluating, and communicating information | LS2.C Ecosystem, dynamics, functioning, and resilience |                                 |

### Common Core English Language Arts

| Reading: Informational Text | Writing | Speaking & Listening                                                         | Language |
|-----------------------------|---------|------------------------------------------------------------------------------|----------|
| RI. 6.7, RI.7.7, RI.8.7     |         | SL.6.1, SL.6.2, SL.6.4,<br>SL.7.1, SL.7.2, SL.7.4,<br>SL.8.1, SL.8.2, SL.8.4 |          |

### Common Core Mathematics

| 6 through 8 | 9 and 10 |
|-------------|----------|
| N/A         | N/A      |

### Other Common Core

| Science                     | History/Social Studies     |
|-----------------------------|----------------------------|
| CCSS.ELA-LITERACY.RST.6-8.4 | CCSS.ELA-LITERACY.RH.6-8.4 |